EPA Five-Year Review Signature Cover

Key Review Information

SITE IDENTIFICATION		
Site Name: North Hollywood Dump Site		
EPA ID: TND980558894		
Region: IV	**State:** TN	**City/County:** Memphis/Shelby County
SITE STATUS		
NPL status: Deleted		
Remediation Status: Complete - Long term monitoring and maintenance ongoing		
Multiple OUs? NO		**Construction completion date:** September 1997
Has site been put into reuse? NO		
REVIEW STATUS		
Reviewing agency: US Army Corps of Engineers (USACE)		
Author name: Norman Newman		
Author title: Geotechnical Engineer		**Author affiliation:** USACE, Memphis District
Review period: 01/1/2000 – 9/30/2000		
Date(s) of site inspection: 05/08/00		
Type of review: Statutory		
Review number: 1 (first)		
Triggering action event: Construction Completion		
Triggering action date: 01/17/94		
Due date (five years after triggering action date): 01/17/99		

Deficiences:

- The deficiencies identified from the site inspection are:
- Minor damage to landfill cover – rutting and scouring.
- Settlement has occurred in the landfill area causing ponding of surface water.
- An area between the East Landfill Sector and the Abandoned Dredge Pond is experiencing tree growth and
- erosion of the ground surface.
- Scour under the Hollywood Street Bridge that separates the East and West Landfill Sectors
- No identification numbers for many groundwater monitoring wells not in use.
- Vegetation was growing in the security fence near the Abandoned Dredge Pond
- None of these deficiencies listed above would currently cause the remedy to be unprotective.
- People are fishing in the Abandon Dredge Pond. There are no warning signs located on the south side and other areas were the public is accessing the pond that state that the fish in the pond are contaminated with pesticides. It is doubtful that all fish being harvested are being thrown back into the pond and not being eaten. The fish samples taken in 1999 indicate the pesticide levels in the fish have been reduced between 70 and 95 % since remediation of the pond, but have not yet met the 10^{-6} criteria set in the Record of Decision (ROD) nor guidelines established in the April 16, 1993 letter. This letter is included as Appendix D of this report.
- This deficiency may cause the remedy to be not protective as defined in the ROD or as stated in the 1993 letter (Appendix D).

Recommendations and Required Actions:

- The following actions are required to correct these deficiencies and ensure protectiveness in the future:
- The minor damage to the landfill cover should be repaired including growth of new vegetation. This includes the area between the East Landfill Sector and the Abandoned Dredge Pond.
- The scour under the Hollywood Street Bridge should be monitored during the monthly site evaluations. If the erosion continues to migrate towards the toe of the landfill cap, then preventative erosion control measures such as riprap should be placed to stabilize the scoured areas.
- The groundwater wells no longer in use should be properly identified. If the wells are no longer needed at the site, then the wells should be permanently sealed off.
- The vegetation growing in the security fence should be routinely removed.
- It is recommended that the USEPA continue their position that fish from the Abandoned Dredge Pond should not be eaten, and fishing prohibited until it is determined that the fish pesticide levels meet criteria of the ROD and monitoring goals. The next fish sampling is scheduled for 2001. Signs should be posted immediately in several areas along the southern bank of the pond and other areas where the general public is fishing. These signs should warn the public that the fish in the pond are contaminated with pesticides and should not be eaten. The USEPA may also consider increasing surveillance around the

pond and may consider other alternatives to notify the public such as distributing flyers in the neighborhood around the pond. It is also understood that the only way to completely prevent fish from being eaten from the Abandoned Dredge Pond would be to police the area on a daily or routine basis.

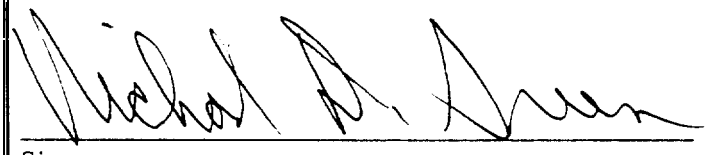
Protectiveness Statement:

Based on the results of this five-year site review and data collected and analyzed from the Long Term Monitoring and Maintenance plan, the remedy for this site is not protective of human health and the environment as defined in the ROD.

Other Comments:

Based on conversation with the Environmental Project Manager (Andy Myslicki) from NWI Land Management who is monitoring the site, all but one of these deficiencies will be corrected as soon as possible. Repairs were presently underway for settlement of the West Sector on the day of the inspection. He stated that the repairs should be completed during this construction season. The concern with pesticide levels in fish tissue is the one outstanding deficiency for which a resolution has not been identified.

Signature of EPA Region 4 Waste Management Division Director



Signature

28 SEP 00

Date

Richard D. Green, Director, Waste Management Division
Name and Title

US Army Corps
Of Engineers
Memphis District

First Five-Year Review Report
For
North Hollywood Dump
Memphis, Tennessee
Shelby County

June 2000

Prepared For:
U.S. Environmental Protection Agency, Region IV
Atlanta, Georgia

Approved by:

Richard Campbell
Remedial Project Manager
U.S. EPA Region IV

Date: 9/28/00

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List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
ACL	Alternate Concentration Level
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CRA	Conestoga-Rover & Associates
HDSC	Hollywood Dump Steering Committee
HI	Hazard Index
LTMMP	Long Term Monitoring and Maintenance Plan
MEC	Memphis Environmental Center
MSCHD	Memphis & Shelby County Health Department
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
QA	Quality Assurance
PRP	Potential Responsible Party
RD/RA	Remedial Design/Remedial Action
RDSAP	Remedial Design Sampling and Analysis Plan
RfD	Reference Dose
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
TAG	Technical Action Group
TNDHE	Tennessee Department of Health and Environment
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Army Corps of Engineers

Executive Summary

The first five-year review of the North Hollywood Dump site in Memphis, Tennessee was completed in June 2000. The results of the five-year review indicate that the remedy is functioning, but does not meet all of the protectiveness criteria for human health and the environment as established in the Record of Decision (ROD). The data taken from the ongoing Long Term Monitoring and Maintenance Program show that the groundwater is meeting the minimum requirements (alternate concentration levels) presented in the ROD. Data from the Long Term Monitoring and Maintenance Program indicate that contaminant levels in fish tissue do not meet the remediation goals established in the ROD, nor the monitoring goals established in a USEPA Region IV letter dated April 16, 1993. Inspection of the, landfill cap revealed that the cap is functioning as designed. General maintenance such as grass mowing, repairing ruts and erosion of the landfill cap, and monitoring the security fence are being performed on a regular basis. A few deficiencies that do not immediately impact the protectiveness of the remedy were noted.

Five-Year Review Summary Form

Five-Year Review Summary Form		
SITE IDENTIFICATION		
Site Name: North Hollywood Dump Site		
EPA ID: TND980558894		
Region: IV	**State:** TN	**City/County:** Memphis/Shelby County
SITE STATUS		
NPL status: ‘ Final T Deleted ‘ Other (specify) Partial deletion of original site		
Remediation Status: ‘ Under Construction T Operating ‘ Complete		
Multiple OUs?* ‘ YES T NO	**Construction completion date:** September 1997	
Has site been put into reuse? ‘ YES T NO		
REVIEW STATUS		
Reviewing agency: ‘ EPA ‘ State T Other: US Army Corps of Engineers (USACE)		
Author name: Norman Newman		
Author title: Geotechnical Engineer	**Author affiliation:** USAC, Memphis District	
Review period:** 01/17/1994 – 6/30/00		
Date(s) of site inspection: 05/08/00		
Type of review:*** T Statutory ‘ Policy (T Post-SARA ‘ Pre-SARA ‘ NPL-Removal only ‘ Non-NPL Remedial Action Site ‘ NPL State/Tribe-lead ‘ Regional Discretion)		
Review number: T 1 (first) ‘ 2 (second) ‘ 3 (third) ‘ Other (specify) _____		
Triggering action:** ‘ Actual RA On-site Initiation by PRP ‘ Actual RA Start at OU# _____ T Construction Completion ‘ Previous Five-Year Review Report ‘ Other (specify) _____		
Triggering action date: 01/17/94		
Due date (five years after triggering action date): 01/17/99		

* “OU” refers to operable unit.

Deficiences:

The deficiencies identified from the site inspection are:

- Minor damage to landfill cover – rutting and scouring.
- Settlement has occurred in the landfill area causing ponding of surface water.
- An area between the East Landfill Sector and the Abandoned Dredge Pond is experiencing tree growth and erosion of the ground surface.
- Scour under the Hollywood Street Bridge that separates the East and West Landfill Sectors
- No identification numbers for many groundwater monitoring wells not in use.

- Vegetation was growing in the security fence near the Abandoned Dredge Pond

- None of these deficiencies listed above would currently cause the remedy to be unprotective.

- People are fishing in the Abandon Dredge Pond. There are no warning signs located on the south side and other areas were the public is accessing the pond that state that the fish in the pond are contaminated with pesticides. It is doubtful that all fish being harvested are being thrown back into the pond and not being eaten. The fish samples taken in 1999 indicate the pesticide levels in the fish have been reduced between 70 and 95 % since remediation of the pond, but have not yet met the 10^{-6} criteria set in the Record of Decision (ROD) nor guidelines established in the April 16, 1993 letter. This letter is included as Appendix D of this report.

This deficiency may cause the remedy to be not protective as defined in the ROD or as stated in the 1993 letter (Appendix D).

Recommendations:

The following actions are required to correct these deficiencies and ensure protectiveness in the future:

- The minor damage to the landfill cover should be repaired including growth of new vegetation. This includes the area between the East Landfill Sector and the Abandoned Dredge Pond.

- The scour under the Hollywood Street Bridge should be monitored during the monthly site evaluations. If the erosion continues to migrate towards the toe of the landfill cap, then preventative erosion control measures such as riprap should be placed to stabilize the scoured areas.

- The groundwater wells no longer in use should be properly identified. If the wells are no longer needed at the site, then the wells should be permanently sealed off.

- The vegetation growing in the security fence should be routinely removed.

- It is recommended that the USEPA continue their position that fish from the Abandoned Dredge Pond should not be eaten, and fishing prohibited until it is determined that the fish pesticide levels meet criteria of the ROD and monitoring goals. The next fish sampling is scheduled for 2001. Signs should be posted immediately in several areas along the southern bank of the pond and other areas where the general public is fishing. These signs should warn the public that the fish in the pond are contaminated with pesticides and should not be eaten. The USEPA may also consider increasing surveillance around the pond and may consider other alternatives to notify the public such as distributing flyers in the neighborhood around the pond. It is also understood that the only way to completely prevent fish from being eaten from the Abandoned Dredge Pond would be to police the area on a daily or routine basis.

Protectiveness Statement:

Based on the results of this five-year site review and data collected and analyzed from the Long Team Monitoring and Maintenance Plan, the remedy for this site is not protective of human health and the environment as defined in the ROD.

Other Comments

Based on conversation with the Environmental Project Manager (Andy Myslicki) from NWI Land Management who is monitoring the site, all but one of these deficiencies will be corrected as soon as possible. Repairs were presently underway for settlement of the West Sector on the day of the inspection. He stated that the repairs should be completed during this construction season. The concern with pesticide levels in fish tissue is the one outstanding deficiency for which a resolution has not been identified.

NORTH HOLLYWOOD DUMP
First Five-Year Review

I. Introduction

The U.S. Army Corps of Engineers, Memphis District (USACE), on behalf of the U.S. Environmental Protection Agency, Region IV (EPA), has conducted a five-year review of the remedial actions implemented at the North Hollywood Dump Site in Memphis, Shelby County, Tennessee. This review was conducted from April 2000 to June 2000. This report documents the results of the review. The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions or reviews are documented. In addition, five-year review reports identify deficiencies, if any, and identify recommendations to address them.

This review is required by statute. EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA 121)©, as amended, states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The NCP part 300.430(f)(4)(II) of the Code of Federal Regulations (CFR) states:

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such no less often that every five years after the initiation of the selected remedial action.

This is the first five-year review for the North Hollywood Dump Site. Due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unrestricted use and unlimited exposure, future five-year reviews will be required.

II. Site Chronology

Table l lists the chronology of events for the North Hollywood Dump site.

Table 1: Chronology of Site Events

DATE	EVENT
1967	City of Memphis closed dump to industrial wastes. Unauthorized dumping continued.
1979	Preliminary investigation begun by EPA & TN Dept. of Health & Envir. (TNDHE)
1979	USGS installed 5 monitoring wells
1980	All dumping ceased by City of Memphis by fencing property
Dec. 1980	TAG, Technical Action Group Formed consisting of EPA Region IV, TNDHE, City of Memphis, Velsicol Chemical Corp. (a Potential Responsible Party, PRP), and Memphis Shelby County Health Department (MSCHD)
Feb. 1981	TAG begins emergency cleanup
August 1981	Remedial Investigation & Feasibility Study (RI/FS) begins
Oct. 1981	Site listed on National Priorities List (NPL)
Feb. 1984	RI/FS completed

June 1984	Conceptual Remedial Design (RD) completed
July 1984	EPA headquarters rejects TAG's RD
Aug. 1984	PRP's agree to perform Remedial Action (RA) sampling – Phase I & II
Oct. 1984	RA Phase I activities completed
Jan. 1985	RA Phase II sediment sampling completed
Feb. 1985	EPA orders PRP's to conduct supplemental RI
April/May 1990	Supplemental RI/FS completed
Sept. 1990	EPA releases ROD, development of RD/RA begins
Aug. 1992	Remedial Design Sampling & Analysis Plan (RDSAP) approved by EPA
April 1993	Letter agreement between EPA Environmental Services regarding fish and sediment retention goals for the Abandon Dredge Pond – Appendix D of this report
July 1993	EPA accepts Remedial Design Date Collection Report
Sept. 1993	EPA accepts RD/RA including RA work plan, Consrt. Health & Safety Plan and QA
Jan. 1994	Construction Contract awarded to Memphis Environmental Center (MEC) for site remediation
Sept. 1997	Construction complete
Dec. 1997	Deletion of the North Hollywood Dump from the National Priorities List (NPL)
Jan. 1998	Begin Long Term Monitoring & Maintenance Plan
8 May 2000	Site inspection for first five-year review

III. Background

a. General Description. The North Hollywood Dump (hereinafter referred to as the Site) was a municipal landfill that operated from the mid-1930's until the mid-1960's. However, unofficial dumping practices continued until 1980. The landfill was used primarily for the disposal of municipal refuse; however industrial refuse was also disposed in the landfill. The site is located in Memphis, Tennessee. See Figure 1 for site map. The site is located on the floodplain and abandoned channels of the Wolf River. The Wolf River presently borders the northern boundary of the property and is a meandering tributary of the Mississippi River. Hollywood Street splits the site into two separate areas of refuse disposal (the East Sector and the West sector). Combined, the East and the West Sectors encompass an area of approximately 70 acres and have an average refuse layer thickness of approximately 26.5 feet. The West Sector contains approximately 1,165,000 cubic yards of waste and the East Sector contains approximately 1,050,000 cubic yards of waste for a combined estimated volume of 2,215,000 cubic yards. Several surface water bodies were located in the vicinity of the Site including:

i. an abondoned dredge pond

ii an Oxbow Lake (former meander isoloated after Wolf River re-channelization)

iii. a Beaver Pond

iv. an active dredge pond

See Figures 1 through 4 in Appendix B for project location and relevant features related to the landfill site.

b. Geology and Hydrogeology. The geology of the Memphis area consists of the Mississippi embayment which is a large structural geologic trough. The trough is comprised of a thick and extensive sequence of unconsolidated marine and fluvial sediments. Only the formations in the upper 1000 feet are considered to be of environmental significance with regard to the North Hollywood Dump (i. through iv. below). From the youngest to the oldest, these geologic units include:

i. recent alluvium which is comprised of heterogeneous accumulations of clay, silt, sand and gravel.

ii loess deposits of windblown silt.

iii. fluvial deposits which are laterally continuous and considered to be remnant terraces of ancestral graded stream.

iv. Eocene clay formations containing minor lenses and interbeds of fine sand or lignite

v. The Memphis sand comprised of a fine to coarse quartz sand which is the primary water source for the Memphis area

ii The Wilcox group which consists of clays of the Flour Island Formation, sands of the Fort Pillow formation, and clays of the Old Breastworks formation.

The hydrogeologic investigations conducted for the Site during the original RI and supplemental RI confirmed the interpretation of the regional geology in the vicinity of the Site. The significant units included in the upper 1000 feet are:

i. Disposed landfill waste

ii Upper Silt Unit (loess deposits)

iii. Fluvial Sands (ancestral terrace deposits)

iv. Lower Clay Unit (Eocene clay also referred to as the Jackson Formation)

Within the landfill limits, the disposed waste is in direct contact with the Fluvial Sands. Outside the limits of the landfill, the Upper Silt Unit is in direct contact with the Fluvial Sands and surface. The Lower Clay Unit (Jackson Formation) which is continuous in the area of the Site and the Memphis area in general underlies the Fluvial Sands. This layer or strata has a very low hydraulic conductivity (approximately 3.9 x 10-7 cm/sec). This Lower Clay Unit acts as an impermeable barrier that separates water movement between the Fluvial Sand layer and the Memphis sand aquifer (located under the clay strata and is the water supply source for the City of Memphis). Therefore, the fluctuating ground water table in the Fluvial Sand strata is perched on top of the Jackson Formation clay strata and is the same fluctuating groundwater table within the waste fill site. The Wolf River is also directly connected to the Fluvial Sands and is isolated above the clay strata. The Wolf River is the main influence on groundwater levels at the Hollywood Dump Site. As shown by ground water data taken at the Site, the ground water flow discharges completely to the Wolf River with no component of flow beneath the river. During periods of high river levels the groundwater flow direction was confirmed to reverse within an area approximately 200 to 250 feet away from the Wolf River. However, this is a short-term trend and reverses back to normal ground water flow as soon as the river subsides. The Site is subject to both headwater and tailwater events. Headwater events result in high river stages on the Wolf River that subside after short durations. Tailwater events occur due to high river stages on the Mississippi River forming a backwater profile up the Wolf River. This type event would generally have a longer duration. Regardless of Wolf River stages, all leachate entering the Fluvial Sand Unit from the North Hollywood Dump will eventually discharge directly into the Wolf River due to the natural flow of groundwater.

Evaluation of the hydraulic conductivity's measured from the Lower Clay Unit confirmed that the clay strata would effectively prevent the migration of contaminants from the Fluvial Sand Unit at the North Hollywood Dump Site through the Lower Clay Unit to the Memphis Sands. This has also been confirmed through a study completed by Graham and Parks (1986) for the Memphis Area. In conclusion, it was determined that the potential for the disposed waste at the North Hollywood Dump to adversely impact the Memphis Sand aquifer to be minimal. Again, this is significant since the Memphis Sand Aquifer is the major source of water supply in the Memphis area.

c. Demography. The North Hollywood Dump is located in a residential area of Memphis with homes on Belmont Circle contiguous to the site. The 1980 census for the area indicates a population of approximately 2,000 within a 0.25-mile radius of the Site and a population of 5,300 within a 0.5-mile radius of the Site. Shannon Elementary School is also situated close to the Site. In May of 1997, it was estimated that approximately 10,000 people live within 3 miles of the Site.

d. Site History before Acceptance of the ROD. Although disposal records for the Site are not available, aerial photographs of the Memphis area between 1937 and 1979 show horizontal expansion of the site between the mid 1930's to the mid-1950's. During the mid to late 1950's active burning was evident and by the late 1950's, expansion of the dump was primarily vertical instead of horizontal. The landfill expanded quickly in the 1960's from under 50 acres to the present 70 acres. By 1967, legal disposal had ceased at the site although unauthorized dumping of non-chemical refuse continued until 1980. The North Hollywood Dump Site was used mainly as a municipal dump by the City of Memphis. Industrial waste generated in the production of sodium hydrochloride and copper-contaminated waste material were deposited in the dump from the late 1940's up. A closed sewer line leading from the Velsicol Chemical Plant containing pesticide-contaminated sludge was removed and discarded in the dump. Several other industrial plants in the Memphis area also used the dump for disposal of waste by-products.

In 1979, EPA and the State of Tennessee began investigating this site due to concerns regarding the possible disposal of hazardous substances in the landfill. Initial studies conducted by the EPA., U.S. Geological Survey (USGS) and local authorities identified chemicals in the dump that had potential to cause adverse health and environmental effects. Based on the results of these studies, a Technical Action Group (TAG) was formed in 1980. The group consisted of personnel from the following agencies: EPA Region IV, the Tennessee Department of Health and Environment (TNDHE), the City of Memphis, Velsicol Chemical Corporation (a PRP) and the Memphis Shelby County Health Department (MSCHD). In October 1981, the North Hollywood Dump was placed on the National Priorities List (NPL) for investigation under CERCLA, commonly referred to as Superfund. During the early 1980's, numerous activities occurred at the site. These activities included immediate removal of contaminated soil, capping of the site by the PRPs, fencing and posting of the site, and numerous sampling activities which were coordinated by the TAG. The temporary vegetated soil cover over the limits of surficial contamination eliminated most contaminated sediment loading to the Wolf River. At the conclusion of the TAG investigation in 1985 (completion of the remedial investigation and feasibility study (RI/FS) and completion of the conceptual remedial design (RD)), the USEPA Region IV accepted the TAG's RD. However, officials in USEPA/Washington (Headquarters) determined that the RD did not satisfy new USEPA guidelines and halted the TAG RA. The USEPA/Washington (Headquarters) wanted to conduct coring into the heart of the dump to see if any hazardous substances had seeped deep into the underlying soil. The USEPA/Washington (Headquarters) was also not satisfied with the cleanup methods chosen by the TAG group including the four inch cover of clean soil called for in the original RD. The USEPA/Washington (Headquarters) did not perceive this cover as an adequate long-term solution to the Site's pollution problems.

Upon notification by the USEPA, a group of PRPs (City of Memphis and Velsicol Chemical Corporation) agreed to perform a supplemental RIMS in 1985. The supplemental RI was required to examine the quality of air, soil, surface water, stream sediments and groundwater at the site in more detail than the original RI. At that time the State of Tennessee became the lead agency and issued a Commissioner's Order under which the supplemental RI/FS would be performed. The State of Tennessee was the lead agency from 1985 to late 1988 when the EPA Region IV became the lead agency. The supplemental RI and FS Reports were finalized in April and May 1990, respectively.

The findings of the supplemental RI confirmed the presence of contaminants at the site, in shallow groundwater beneath the site and in sediments of adjacent surface water impoundments (Oxbow Lake and dredge pond). Table 2 below lists the major contaminants detected at the site:

Table 2 — Major Contaminants Detected at the Site

Chlordane	Heptachlor Epoxide	Arsenic	Copper
Aldrin	4,4 DDT	Barium	Zinc
Heptachlor	Dieldrin	Nickel	Vanadium
Total BHC	Chromium	Lead	Endrin

During the supplemental RI/FS, an analysis was conducted to estimate the health and environmental problems that could result if the contamination at the site was not remediated. This analysis, commonly referred to as a baseline risk assessment, focused on the health effects that could result from long-term direct exposure to high concentrations of contaminants as a result of ingesting the fish or having skin come in contact with the surface soil or surface water. These analyses were based on present conditions at the site including the temporary cap in place and no major increase of contaminants in the shallow aquifer that discharges into the Wolf River. Allowable groundwater

concentrations for discharge to the Wolf River were set based on Federal, state and local quality standards for carcinogen. For non-carcinogens contaminant exposure, the risk was assessed by a Hazard Index (HI) determination. The HI is a number that reflects a comparison of the calculated exposure level for a contaminant at the site to an exposure level that would not cause harm from daily exposure for a lifetime, i.e., the reference dose (RfD). A HI greater than #1 indicates that exposure exceeds the protection level. Carcinogenic risks are expressed as the probability of additional cancer incidence resulting from a lifetime of exposure.

The HI calculated for exposure to non-carcinogens in the soil and surface waters for the North Hollywood Dump was well below 1. Therefore, these substances are not present at levels that would be expected to cause concern. Likewise, exposure to carcinogenic compounds through the soil or surface water contact was also determined not to be a health concern. For the exposure pathway addressing ingestion of aquatic organisms and fish from the Wolf River, it was concluded that residual ground water loading from the site would not significantly impact the Wolf River water quality beyond preestablished regulatory health-based criteria. Analyses of fish samples taken from ponds located in the vicinity of the Site (Abandon Dredge Pond, Oxbow Lake, and Beaver Pond – See Section IIIa of this report) indicated contaminants in fish above acceptable human health levels during the supplemental RI investigation. However, all of these fish were killed and buried during the remedial actions phase of this project.

Groundwater ingestion was not considered an exposure pathway since the contaminated shallow groundwater is located directly beneath the site and flows directly into the Wolf River. There are currently no domestic supply wells located in the Fluvial Sand Unit (shallow aquifer) between the Site and the Wolf River. Since there are no current wells at the Site and the governing laws will not allow access to the shallow aquifer, the public will have no direct exposure to the contaminants detected in the shallow aquifer. Several laws or ordinances exist in both the city and county policies that would prevent legal installation of a well into the contaminated groundwater. The City of Memphis has- an ordinance that prevents the installation of a water supply well into the shallow aquifer within city limits if City water is available. Shelby County has a Groundwater Quality Control Board established under Ordinance No. 3736 that is required to secure, protect and preserve the quality and quantity of groundwater within Shelby County. This governing body has responsibility for enforcing the development of groundwater use in Memphis. In addition, the Shelby County Health Department has regulations for the construction and modification of water wells in Shelby County. One stipulation of these regulations is that all wells be constructed at least two feet above the 100-year flood plain. The area between the Site and the Wolf River is within the 100-year flood plain.

The landfill property is currently not being used for any residential, commercial or municipal activities and there are no plans for future use.

IV. Remedial Actions

a. Remedy Selection

The Record of Decision (ROD) for the North Hollywood Dump was signed on September 13, 1990. In summary, based on the results of the risk assessment, actual or threatened releases. of hazardous substances from North Hollywood Dump, if not addressed by implementing the response action selected by the ROD, may present an endangerment to public health, welfare or the environment. The remedial action objectives were to

- Install and maintain a 24-inch low-permeability soil cover over the landfill area.

- Consolidate contaminated soil near the surface water bodies under the 24-inch cover in the controlled portion of the landfill less prone to flooding and erosion.

- Monitor shallow groundwater contaminant levels to insure levels stay below health based standards set to control groundwater discharges to the Wolf River.

- Should groundwater levels increase, extract groundwater and discharge to the local sewer system

- Re-sample Oxbow Lake and the Dredge Pond sediments and fish to better identify and define the contamination.

- Install and maintain a 36-inch hydraulic cover over the contaminated sediments.

- Remove contaminated fish and re-stock surface water impoundments to maintain the environmental food chain of the area.

- Install and maintain a fence around the entire site.

- Impose land and groundwater restrictions on the site.

b. Remedy Implementation

The remedial design (RD) for the North Hollywood Dump was started in December of 1991 and was accepted by the USEPA on September 27, 1993. The Memphis Environmental Center (MEC) or the PRP's primary consultant, completed the remedial design. The PRP's Remedial Action Construction Contract was advertised and awarded to the MEC on January 17, 1994. MEC began cleanup activities in early 1994. The 1994 construction activities included bringing the cover thickness of both landfill sectors to 24-inches in thickness. It also included flattening the landfill slopes to 1V:3H and placement of contaminated drums, refuse, debris, and soil under the protective Site covering. Other activities included broadcasting of fertilizer and seeding of the landfill surface in order to establish a hardy growth of vegetation.

The 1995 and 1996 construction schedule included removal or harvesting of the fish from all three surface water bodies (Abandoned Dredge Pond, Oxbow Lake and Beaver Pond) and disposing of the fish under the landfill cover. Both the Oxbow Lake and Beaver Pond were filled and sloped to drain. The center portion of the Abandoned Dredge Pond was utilized as a borrow source after the top 40-inches of contaminated sediments were removed and deposited under the protective cover of the Oxbow Lake. The remaining east and west sides and floor of the pond were covered with a combination hydraulic dredge fill from the center area of the pond and imported sand from an off site borrow source. The minimum cover of 36-inches was met with the thickness varying in places up to 7 feet. The pond was restocked naturally from the Wolf River from backwater flood conditions during high river stages on the Mississippi River. Backwater flooding has occurred twice (1997 and 1998) since completion of the remedial work by MEC in December 1996. The Final Site Inspection occurred on January 30, 1997. Participating in the inspection were representatives from the United States Environmental Protection Agency (USEPA), Tennessee Department of Environment and Conservation (TDEC), Memphis Environmental Center, Inc. (MEC) and Conestoga-Rovers & Associates (CRA). The inspection resulted in some minor corrective actions with acceptance of the project in September of 1997.

The North Hollywood Dump Site was removed or deleted from the National Priorities List (NPL) in December of 1997. The "Notice of Intent to Delete" by the USEPA Region IV was published in the Federal Register, vol. 62, no. 197, pages 52961- 52963. The "Notice of Deletion" by the USEPA Region IV was published in the Federal Register, vol. 62, no. 250, page 68216:

The Long Term Monitoring and Maintenance Plan (LTMMP) began in January 1998. This plan requires groundwater monitoring, periodic inspections of the site to ensure site maintenance and erosion control measures are effective along with maintenance of the perimeter fence. As stated in the ROD and Consent Decree, groundwater found to be exceeding ACL's is to be pumped from the shallow aquifer and discharged in the municipal sewer system. NWI Land Management was awarded the contract for the LTMMP.

Another stipulation of the ROD is that the EPA will not endorse or approve of fishing in the Wolf River or Abandoned Dredge Pond until it is determined that the contamination levels in the fish are below the ACL's established for the Site and adjacent water. Based on testing from fish samples in June 1999, levels of chlordane still exceed the maximum levels established in the ROD and the control levels measured in the Wolf River fish. Therefore, the ban on eating the fish from the Abandon Dredge Pond will stay in effect.

c. Operation and Maintenance.

The Hollywood Dump Steering Committee (HDSC) is responsible for the LTMMP for the North Hollywood Dump Site. As stated above, NWI Land Management has been awarded the contract for the monitoring program. Routine long-term O&M began approximately in January 1998 and is projected to continue until the year 2027. Two years of routine O&M are now complete (i.e., 1998 and 1999). These Site costs are presented in Table 3 below. These actual costs were compiled from the Hollywood Dump Site Trust Fund records. The annual costs for 1998 and 1999 are identified as approximate in Table 3 because the Trust Fund records referenced in Table 3 are not clear when services were performed for the Site and when the invoices were received and paid by the Trust Fund. This factor is especially relevant near the beginning and end of each year. However, the values provided in Table 3 should provide enough accuracy for comparison with the original estimates as presented in the Supplemental Feasibility Study (FS) for the Site in May 1990.

The FS was prepared by Conestoga-Rovers and Associates (CRA) to evaluate corrective action alternatives for the Site. Cost estimates for the various alternatives were provided in Appendix C of that document. This information was the basis of the costs used by the USEPA in Tables 23 and 25 of the September, 1990 Record of Decision (ROD) for the Site. The cost estimate for the O&M components of the RA selected in the ROD are summarized in Table 4 below.

Some differences in the individual cost components are expected when comparing the FS cost estimates with the actual costs. This is evident from Tables 3 and 4. However, the actual costs incurred with Site O&M are generally consistent with the estimates previously provided in the FS. Based on costs generated in the first two years, it is anticipated that the annual O&M costs will remain generally consistent with the forecasts identified in the FS. It is also noted that non-routine expenses may arise during the O&M period that were not accounted for in the cost forecasts. For example, on September 30, 1999 the USEPA submitted an oversight cost recovery demand in the amount of $1,349,143.16. The HDSC is currently cooperating with the USEPA to investigate this claim.

The work at the Site is being conducted in accordance with the approved Long Term Monitoring Maintenance Plan. In general, the work consists of the following:

- Ongoing maintenance of the landfill cap & general maintenance of the Site
- Mowing as needed – generally 4 to 5 times per year
- Fertilizing annually
- Initial quarterly sampling (1998) & ongoing semi-annually sampling & testing of the shallow groundwater aquifer through 16 groundwater monitoring wells. The wells used for sampling are shown on Figure 4 in Appendix A.
- Routine surface water monitoring is performed semi-annually except for 1998 when sampling was quarterly. The surface water samples are taken upstream of the Site, downstream of the Site and adjacent to the Site.
- Monthly Site inspections with more extensive inspections quarterly
- Quarterly reporting with an annual summary report at the end of each year
- Fish & sediment sampling & testing every two years.

TABLE 3
1998 & 1999 O&M COST SUMMARY
LANDFILL/GROUNDWATER AND IMPOUNDMENT REMEDIAL ACTION

Year[1]	Groundwater Monitoring	Wolf River Monitoring	Wolf River Biota Monitoring	Landfill Inspection and Maintenance	MonitoringWell Inspection and Maintenance	Impoundment Surface Water Monitoring	Impoundment Biota Monitoring	Total Annual Cost
1998	$ 34,000	$ 10,000	$ 0	$ 136,000	$ 1,000	N/A	$ 0	$ 181,000
1999	$ 21,000	$ 7,000	$ 6,000	$ 97,000	$ 3,000	N/A	$ 18,000	$ 152,000

1. Expenditures for 1998 and 1999 are approximate.
2. N/A – Not Applicable. Impoundment surface water monitoring is not required to be performed at the site.

TABLE 4
1990 O&M COST ESTIMATE SUMMARY[1]
LANDFILL/GROUNDWATER AND IMPOUNDMENT REMEDIAL ACTION

ANNUAL COST ESTIMATES

Year[1]	Groundwater Monitoring	Wolf River Monitoring	Wolf River Biota Monitoring	Landfill Inspection and Maintenance	Monitoring Well Inspection and Maintenance	Impoundment Surface Water Monitoring	Impoundment Biota Monitoring	Total Annual Cost
1	$ 45,160	$ 9,600	$ 14,400	$ 82,750	$ 2,000	$ 2,700	$ 910	$ 157,520
2	$ 45,160	$ 9,600	$ 14,400	$ 57,250	$ 2,000	$ 2,700	$ 910	$ 132,020
3-5	$ 45,160	$ 9,600	$ 14,400	$ 53,250	$ 2,000	$ 2,700	$ 910	$ 128,020
6-30	$ 22,580	$ 6,600	$ 7,200	$ 52,950	$ 2,000	$ 540	$ 910	$ 92,780

PRESENT WORTH ESTIMATES[2]

Year	Groundwater Monitoring	Wolf River Monitoring	Wolf River Biota Monitoring	Landfill Inspection and Maintenance	Monitoring Well Inspection and Maintenance	Impoundment Surface Water Monitoring	Impoundment Biota Monitoring	Total Present Worth
1-30	$ 444,870	$ 114,450	$ 141,850	$ 846,760	$ 30,740	$ 17,650	$ 13,990	$ 1,610,310
							Administration and Legal Expenses (20% of Total)	$ 322,060
							Contingency (25% of Total)	$ 483,090
							Total Present Worth	$ 2,415,460

1 1990 costs were taken from the May 1990 Supplemental Feasibility Study(Appendix C), prepared by Conestoga-Rovers and Associates.
2 The Present Worth values were calculated rising a 5% net discount factor.
3 Long-term O&M activities began in January 1998.

V. Five-Year Review Process

Cory Williams and Norman Newman of the Memphis District U.S. Army Corps of Engineers (USACE) led the North Hollywood Dump five-year review and inspection. Both Mr. Williams and Mr. Newman are Geotechnical Engineers at the Memphis District. The USACE is performing the review at the request of the United States Environmental Protection Agency (USEPA). The following personnel assisted in the inspection and review:

- James Taylor, USACE, Project Manager for Memphis District & coordinator for the review
- Andy Myslicki, Project coordinator for the Site and an environmental project manager for NWI Land Management
- Fred Swan Jr., Wildlife Biologist for Ensafe INC., local company hired by NWI Land Management for obtaining samples and maintenance at the Site.

The first five-year review consisted of the following activities: a review of relevant documents (See appendix A), interviews with local government officials and representatives of the construction and the operations contractors; and a site inspection.

VI. Five-Year Review Findings

A. Interviews

The following individual were contacted by telephone as part of the five-year review including an invitation to participate in the Site inspection:

- Paul Patterson, Administrator of Solid Waste Management for the City of Memphis and Chairman of the Hollywood Dump Steering Committee (HDSC).
- George R. Harvell III., Manager, Environmental Services at Memphis Environmental Center (MEC) and past Chairman of the Hollywood Dump Steering Committee.

Telephone conversations were conducted with both personnel listed above before the site inspection and during the development of this report.

B. Site Inspection

The site inspection of the North Hollywood Dump took place on 8 May 2000. The site inspection team consisted of representatives from the USACE, NWI Land Management and ENSAFE. The team inspected all sampling wells, the landfill cap, the surface water drainage system and site fencing. Other areas inspected included the Abandoned Dredge Pond, the previous site location of Beaver Pond and Oxbow Lake, the Wolf River and adjacent areas in the vicinity of the landfill. A summary of the inspection findings is presented below. See Appendix C for Photo’s of the site inspection.

Conditions during the inspection were favorable with moderate temperatures and no precipitation. The site vegetation had been recently mowed which facilitated inspection of the cap and adjacent areas.

The landfill cap was found to be in good condition. The vegetative cover was thorough and abundant, with no distressed areas, trees or shrubs. No noticeable depressions, excessive cracks, leachate seeps, odors, or other indications of stress were noted with the exception of an area in the center of the West Sector. This area had recent settlement and was in the process of being repaired by NWI Land Management. The maximum settlement that has occurred is approximately two feet with the majority of the area subsiding in the range of one foot. This depressed area was being filled with a suitable soil material located near the Site (See Photo No's. 9 through 20). There were several other areas where tractor ruts as deep as one foot had occurred during mowing. Other areas had minor scouring of the landfill cap where concentrated surface drainage had caused surface erosion. This erosion was basically limited to the upper foot or less of the cap in small concentrated areas generally along the slopes of the landfill. There were no instances were the cap had been completely removed exposing the landfill. There was some surface water ponding along the fence of the East Sector near Hollywood Street (See Photo No.'s 6 & 27).

All of the groundwater monitoring wells were inspected for proper identification, accessibility (locked to prevent unauthorized entry) and water tight caps. All sixteen wells were properly identified, locked and had water tight seals. These wells are used for sampling and monitoring of groundwater levels. The inspection team noted that there were many existing groundwater monitoring wells, mainly within the top area of the both landfill sectors that were not properly marked and no longer in use. Some of these wells were marked or could be determined by the locations shown on existing maps as to the proper tag number. However, the inspection team was unable to determine proper identification for some of these unread wells. None of these wells are included in the LTMMP. There are two United States Geological Survey (USES) groundwater monitoring wells that are read by satellite on a continuous basis. The Wolf River is also monitored for surface water elevations and discharge volumes at the Hollywood Street bridge by USES on a continual basis (See Photo No.'s 21 through 26).

Scour of the ground surface was noted by the inspection team in the berm area under the Hollywood Street Bridge. Surface water from both the East and West Sectors concentrates under the bridge just past the southern abutment. The concentrated flows are scouring the loess silt material along the beam forming significant ditches to where the drainage empties into the Wolf River. Some of the scour areas were as deep as four to six feet. This scour is beyond the limits of the landfill cap, but the scoured ditches are beginning to migrate towards the toe of the landfill cap. Unless measures are taken to prevent additional scour in the future, this erosion condition will continue to worsen in this area (See Photo No's. 1 through 5).

There was scour on the ground surface between the toe of the landfill slope of the East Sector and the Abandoned Dredge Pond. This area was also experiencing significant growth of trees and shrubs. Although this area is outside the limits of the landfill cover, it could be smoothed over, seeded and added to the maintenance program to prevent the condition from worsening. Based on conversation with ENSAFE personnel that provide groundwater samples and participate in monthly site inspections, fishing in the Abandoned Dredge Pond is witnessed on a regular basis. No one was fishing during the site inspection, but a fishing boat was tied to the shore of the pond (See Photo No's 7 through 10).

Interviews were conducted several weeks after the site inspection with two homeowners located adjacent to the pond. Both stated that they were aware of the fish being contaminated and did not fish in the pond. However, both individuals said that some of their neighbors were aware of the contaminated fish and choose to eat them anyway. One of the homeowners stated that there appeared to be more individuals fishing in the pond recently that do not live in the area. Additional conversation was conducted with two individuals fishing on the southeastern side of the pond. Both stated that they were unaware of the fact that the fish were contaminated in the pond. However, they both chose to continue fishing after it was explained to them that the fish in the pond had pesticides levels exceeding guidelines mandated for safe eatable fish levels. Inspection of the shore area along the southern edge of the pond revealed the fact that no posted signs warning of contaminated fish could be found. Posted "no trespassing" warning signs were posted along the perimeter fence of both sectors of the landfill.

The fence located around the perimeter of both sectors appeared in good condition with all gates secured. All vegetation growing in the fence had been removed except for a small area near the Abandoned Dredge Pond and a

strip along the West Sector paralleling Hollywood Street. The fence ends at the southwest corner of the pond and does not encompass the pond area due to private ownership of land along the southern bank.

C. Risk Information

The alternate concentration levels (ACL's) for groundwater were established using the mass flux calculation. A 10^{-6} risk level for the consumption of fish from the Wolf River and adjacent water surface bodies was used to develop fish tissue goals for remediation in the ROD. Fish tissue goals for monitoring were established in a letter from USEPA Region IV Remedial Project Manager (Barnett) to Mr. George Harvell dated April 23, 1993. The letter states that contaminant fish tissue concentrations in the Site-impoundments shall not exceed fish tissue pesticide concentrations from the Wolf River. This letter also establishes fishing restrictions from Site impoundments as long as fishing is restricted from the Wolf River. The tables below compare fish tissue concentrations from the Site abandoned dredge pond with the remediation and monitoring fish tissue goals, as well as USFDA Edible Portion of Fish Levels, an identified ARAR for the Site. Site fish tissue concentrations exceed the risk-based remediation goals established in the ROD and also exceed levels in fish from the Wolf River.

Table 5 – Ave. Pesticide Levels from Fish Samples from the Abandoned Dredge Pond, 1999

Parameter	USFDA Edible Portion of Fish Levels (ug/kg)	ROD 10^{-6} Value (Table 24) (ug/kg)	3rd Quarter 1999 Average Fillet(1) Values all trophic levels (ug/kg)	Additional Cancer Risk (2)
Chlordane	300	8.3	510	6.8×10^{-6}
Chlordene	NA	8.3	30	4.0×10^{-7}
Endrin	NA	3200	9	NA
Heptachlor Epoxide	300	2.4	9	3.0×10^{-6}

Notes:

(1)Estimate based upon a 1:3 ratio of fillet to viscera concentration determined in Remedial Design Data Collection Program report.

(2)Based upon current slope factors, chlordane slope factor used for chlordene, assumptions presented in third quarter monitoring report

Table 6 - Comparison of Abandoned Dredge Pond and Wolf River Fish Data, 1999

Trophic Level	Compound	Average Concentration Dredge Pond (mg/kg)	Average Concentration Wolf River (mg/kg)
Bottom Feeders	Chlordane	2.22	--
	Chlordane	0.21	--
	Endrin	0.04	0.0027
	Heptachlor Epoxide	0.04	--
Top Predators	Chlordane	2.2	0.540
	Chlordane	0.06	--
	Endrin	0.03	0.045
	Heptachlor Epoxide	0.03	0.010
Foragers	Chlordane	0.26	--
	Chlordane	0.01	--
	Endrin	0.01	--
	Heptachlor Epoxide	0.01	--

An evaluation by Contestoga-Rovers and Associates (CRA) of the fish tissue taken from the Abandoned Dredge Pond and the Wolf River is presented in Attachment 4 of the Third Quarter Monitoring and Maintenance Progress Report, submitted to the USEPA on November 16,1999. The evaluation includes a statistical comparison of the Wolf River samples with the Abandoned Dredge Pond samples. In general, the remediation of the Abandoned Dredge Pond has achieved significant reduction in pesticide levels in the fish, but the recent fish tissue samples have not met the remediation or monitoring criteria established in the ROD and the April 16,1993 USEPA Region IV letter for chlordane, chlordene, and heptachlor epoxide. No promulgated standards for the contaminants of concern have become more stringent since the signing of the ROD in 1990. Since no major changes have occurred at the Site as indicated from data during the LTMMP that would have an impact on the assumptions assumed during development of the ACL limits, these limits are still considered protective. However, toxicity values for chlordane have become less stringent, the additional cancer risk values in Table 5 for chlordane and chlordene were developed using the revised slope factor for chlordane. Reevaluation of the ROD 10^{-6} remediation goal for chlordane and chlordene is recommended based upon the change in the slope factor for chlordane. Reevaluation of the chlordene value is recommended as the chlordane slope factor was utilized as a surrogate for toxicity.

D. Data Review

North Hollywood Dump Superfund Site ARAR Review. An ARAR review was performed for the site in accordance with the draft EPA guidance document, "Comprehensive Five-Year Review Guidance," EPA 540R-98-050, April 1999.

Documents reviewed for the ARAR analysis:

1. Record of Decision
2. Quarterly Monitoring and Maintenance Report First Quarter 1998 (April 1998)
3. Quarterly Monitoring and Maintenance Report Second Quarter 1998 (August 1998)
4. Quarterly Monitoring and Maintenance Report Third Quarter 1998 (November 1998)
5. Quarterly Monitoring and Maintenance Report First Quarter 1999 (April 1999)
6. Quarterly Monitoring and Maintenance Report Third Quarter 1999 (November 1999)
7. Quarterly Monitoring and Maintenance Report Fourth Quarter 1999 (March 2000)
8. 1999 Annual Report Long-Term Monitoring and Maintenance Program

ARARs Identified in the ROD Requiring Evaluation During the Five-Year Review:

There were no location-specific ARARs identified in the ROD. There was one chemical specific ARAR and seven (7) action-specific ARARs as follows.

Chemical Specific ARAR

1. Tennessee Water Quality Criteria (1200-4)

Action Specific ARARs

1. Tennessee Solid Waste Regulations, Rule 1200-1-7 – 001-007
2. Tennessee Water Quality Control Act, TN Code 69-3-104
3. Clean Water Act (40 CFR 122), including 404
4. National Pretreatment Standards (40 CFR 403)
5. Chapter 33 of the Memphis Code related to "Sewer and Sewage Disposal" (Memphis Sewer Ordinance)
6. USFDA Edible portion of Fish levels
7. National Primary and Secondary Ambient Air Quality (40 CFR 50)

In performing the 5-year review for compliance with ARARs, only those ARARs addressing risk posed to human health or the environment (i.e., address the protectiveness of the remedy) were reviewed. This is in keeping with current EPA guidance on 5-year reviews. Action specific ARARs applicable to the construction phase of the remediation included:

- Tennessee Solid Waste Regulations, Rule 1200-1-7 – 001-007
- Clean Water Act (40 CFR 122), including 404
- National Pretreatment Standards (40 CFR 403)
- Chapter 33 of the Memphis Code related to "Sewer and Sewage Disposal" (Memphis Sewer Ordinance)
- National Primary and Secondary Ambient Air Quality (40 CFR 50)

It is assumed that these ARARs were complied with during construction as specified in the ROD. They will not be discussed any further in this analysis.

The following ARARs were evaluated as pertaining to the protectiveness of the remedy:

1. Tennessee Water Quality Criteria (1200-4)

Tennessee Water Quality Criteria were identified as an ARAB in the ROD and a list of twenty-one (21) contaminants are periodically listed in the Quarterly Monitoring and Maintenance Reports for comparison to surface water samples taken in the Wolf River adjacent to the site. The down gradient portion of the site has been divided into six (6) cells. Collecting ground water samples from 10 wells monitors these six cells and the ground water is monitored for constituents of concern. This data is compared to derived Alternative Contaminant Levels (ACLs) for loading into the Wolf River as presented in the ROD. Quarterly Monitoring Reports were reviewed and based on the ACLs listed for comparison, there has been one round of sampling that exceeded the ACL for Chlordane. Three of the ten wells indicated levels above the maximum allowed and this data is presented in Table 7 below. These results were also reported in the Fourth Quarter 1999 Monitoring Report. The average concentration presented in Table 7 (fourth row) is the average of all 10 groundwater samples which included non-detects in some of the wells. The ACL is listed for comparison only. However, this exceedance appeared to be a potential anomaly associated with well sampling techniques and was further investigated in March of 2000. Additional samples were taken (March 1 & 27, 2000) from the monitoring wells that showed pesticide levels exceeding the ACLs as listed below. These samples were collected by using low flow purging and sampling techniques verses a bailer that was used during the December 1999 sampling. The bailer was used on these particular wells because of problems with the pumps that had been used in the past. For each of the confirmatory samples collected, groundwater was purged until turbidity stabilized. The results of the confirmatory sampling resulted in non-detections for Technical Chlordane for each of the wells re-tested. Based on these results, it was concluded that the Technical Chlordane detections resulted from sample turbidity due to the different sampling method and insufficient purging of the wells prior to sample collection. Future monitoring should validate this determination.

Table 7 - Avg. Chlordane Concentrations from Fourth Quarter Sampling, 1999

Sample ID	Sample Date	Chlordane (ug/L)
TAG-6D	12/8 -12/9/99	0.58
TAG-7S	12/8 -12/9/99	2.70
TAG-5S	12/8 -12/9/99	2.26
AVG/ACL	12/8 -12/9/99	0.77/0.51

It should be noted that there is an apparent discrepancy with the Wolf River Water Quality Criteria listed in the Quarterly Monitoring and Maintenance Reports and the water quality standards in the Tennessee State Administrative Code (1200-4-3-.03). Since surface water bodies typically have multiple designated uses (i.e. fishing, swimming, drinking water etc.) it was not possible to make a determination of the specific designated use assigned to the Wolf River and the associated water quality standards. However, discrepancies appear to exist. As an example the Quarterly Monitoring and Maintenance Reports list the Wolf River Water Quality Criteria for zinc as 47,000 ug/1 (See Table 4, 4th Quarter 1999 Report). After reviewing the ROD it became apparent that there is a problem with units in the table. The units for Table 4 are ug/l, however, in the ROD it is clear that several of the Wolf River Water Quality Criteria are in ng/1 (i.e. 47,000 ug/l zinc should read 47,000 ng/l zinc).

2. USFDA Edible portion of Fish levels

"USFDA Edible portion of Fish levels" was listed as an ARAR, however no specific values were identified from these regulations (Tile 21 Code of Federal Regulations). A USFDA Industrial Activities Staff Booklet (March 1998) titled *Action Levels for Poisonous or Deleterious Substances in Human Food and Animal Feed* does identify action levels based on USFDA criteria. The applicable action levels for the site are identified in Table 5 based on the 1998 USFDA booklet. No specific chemicals or concentrations relative to USFDA levels were identified in the ROD. The ROD discusses the development of acceptable sediment concentrations based on a 10^{-6} risk for fish consumption. Further page 71 of the ROD states:

ARARs for the surface water impoundment include Food and Drug Administration's (FDA) action levels for contaminants in fish tissue. However, it is anticipated that levels set on a 10^{-6} risk level using the data taken from the fish sampling that will be performed during the RD will be lower than the FDA action levels. In the interest of public health, EPA will use the fish concentration levels that are more protective in establishing acceptable sediment concentration levels and remediation requirements for the surface impoundments."

Final fish tissue goals for monitoring were established in the USEPA Region IV letter dated April 16, 1993, and were based upon comparison of pesticide levels in fish from the Wolf River to those fish from the Site impoundments. Compliance with these values is discussed above.

Summary of Site Compliance with ARARs:

The site appears to be in compliance with ARARs identified in the ROD with the following exceptions:

- One average round of groundwater sampling data (12/99, See Table 7) for comparison with the ACL of Chlordane indicated an exceedance. More recent follow up sampling has indicated groundwater discharges to the Wolf River are meeting established criteria.

- While not mentioned in the documents reviewed, there is some anecdotal evidence that fishing is occurring within the Abandoned Dredge Pond. Under Documentation of Significant Changes, Page 102 of the ROD, EPA states *It is not the intent of EPA to approve of fishing in the impoundments until it is determined that it is safe again to fish*. While not an ARAR, from the protectiveness of the remedy perspective, restricted access control measures should be further evaluated. When comparing allowable contaminant fish levels identified in Table 24 of the ROD with the data presented in the third Quarter 1999 Monitoring and Maintenance Progress Report, fish tissue samples, while improving, have not yet met the defined 10^{-6} criteria.

- Since USFDA action levels apparently have not been promulgated for pesticides of concern, but are identified by action levels in USFDA documents, it is suggested that they continue to be monitored during subsequent 5 year reviews.

VII. Assessment

The following conclusions support the determination that the landfill cover system at the North Hollywood Dump site is effective and contributing to protection of human health and the environment.

Effectiveness of Remedy. The landfill cover system has been effective in isolating waste and contaminants. As previously discussed, some minor erosion/rutting has occurred on the cap but it does not affect the performance and integrity of the cover system. The contaminant levels in the groundwater at the site appear to be consistent with expectations at the time the ROD was signed. Institutional controls are in place and no current or planned changes in use at the site suggest that they are not effective. Although these factors appear to indicate that the remedial actions continue to be effective, groundwater monitoring should be closely scrutinized to ensure that the high chlordane readings were indeed related to sampling technique. These factors indicate that the remedial actions continue to be effective and that the North Hollywood Dump continues to be operating and functioning as designed.

Adequacy of O&M: O&M procedures are consistent with requirements. No significant difficulties have occurred to date.

Early Indicators of Potential Remedy Failure: No early indicators of potential remedy failure were noted during the review. O&M costs and maintenance activities have been consistent with expectations.

VIII. Deficiencies

Deficiencies were discovered during the five-year review and are noted below. With the exception of v. below, these deficiencies are easily correctable, and do not warrant a finding that the remedy is not protective. The levels of pesticides measured in fish tissue do warrant a finding that the remedy is not protective, however, as the levels measured exceed both background levels measured in the river and remediation levels established in the ROD.

i. There were ruts and minor erosion of the landfill cover or cap. There were two areas in the landfill cap that were ponding surface water. There was scour of the natural ground surface between the landfill cap and the Abandoned Dredge Pond. This area was also experiencing significant growth or trees and shrubs.

ii. There are many groundwater monitoring wells that were used in development of the RI/FS that are no long in use (abandoned) and some of these wells were not properly identified.

iii. Scour is occurring under the Hollywood Street Bridge adjacent to both the East and West Sectors of the landfill.

iv. There was some vegetation growing in the security fence near the Abandoned Dredge Pond.

v. People are fishing in the Abandon Dredge Pond. There are no warning signs located on the south side and other areas where the public is accessing the pond that state that the fish in the pond are contaminated with pesticides. It is doubtful that all fish being harvested are being thrown back into the pond and not being eaten. The fish samples taken in 1999 indicate the pesticide levels in the fish have been reduced between 70 and 95 % since remediation of the pond. Pesticide levels would result in a total estimated excess cancer risk of 1×10^{-5}, but has not yet met the protectiveness criteria determined in the Record of Decision (ROD).

IX. Recommendations

The following recommendations are made to address the deficiencies noted above:

i. NWI Land Management was in the process of repairing the large area in the of the West Sector where settlement of the landfill had occurred. This area along with the tractor ruts, minor scour along the slopes and the area along the fence of the East Sector where ponding is occurring shall be filled with suitable material, sloped to drain and recovered with adequate vegetation. The area between the East Landfill Sector and the Abandoned Dredge Pond should also be cleared, graded to drain and added to the landfill area that is currently maintained by routine mowing.

ii. If the existing groundwater monitoring wells are not to be used in the future, then measures shall be taken to properly seal each well. If the wells are to remain in place, then each well shall be properly identified, surveyed to determine existing condition and located on a site map for the landfill.

iii. The scour under the Hollywood Street Bridge shall be monitored and included in the monthly site evaluations. If the erosion continues to worsen, then measures shall be taken to prevent the erosion from damaging the slope of the landfill cap.

iv. The vegetation shall be removed from the Site security fence and maintained in the future.

v. It is recommended that the USEPA continue their position that fish from the Abandoned Dredge Pond should not be eaten until it is determined that the fish are safe to eat. Although 1999 data indicates that the average levels of pesticides in the fish have improved by decreasing 70 – 95% compared to those in 1992 (before remedial actions taken), the levels do not yet meet the risk based criteria of the ROD. The next fish sampling is scheduled for 2001 and the results should be reevaluated at that time. Signs should be posted immediately in several areas along the southern bank of the pond and other areas were the general public is fishing. These signs should warn the public that the fish in the pond are contaminated with pesticides and should not be eaten. The USEPA may also consider increasing surveillance around the pond and may consider other alternatives to notify the people such as distributing flyers in the neighborhood around the pond warning of contaminated fish. It is also understood that the only way to completely prevent fish in the Abandoned Dredge Pond from being eaten would be to police the area on a daily basis and not allow fishing.

vi. Risk-based remediation goals for sediments and fish tissue presented in the ROD goals need to be revisited due to changes made in 1998 to, toxicity values for chlordane in USEPA's IRIS database. Values for both chlordane and chlordene need revisiting as chlordane was used as a surrogate for chlordene.

vii. Food and Drug Administration's (FDA) action levels for contaminants in fish tissue should continue to be monitored as they are not associated with any promulgated standard.

X. Protectiveness Statement

The remedies remain effective at the North Hollywood Dump Site, however pesticides in fish tissue are above the protectiveness criteria established in the ROD. The cap appears to be effective at containing contaminants in the landfill. The LTMMP data indicates that the ACL's specified in the ROD are being met for groundwater at the Site.

XI. Next Review

This is a statutory site that requires on going five-year reviews. USEPA will conduct the next review within five years of the completion of this first five-year review report. The completion date is the date of the signature shown on the signature cover attached to the front of the report

Appendix A — Documents Reviewed
North Hollywood Dump Site

Documents Reviewed

"Record of Decision (ROD)," USEPA Region IV, September 1990.

"A Remedial Action Report 1995 – 1996 Construction Activities," by Conestoga-Rovers & Associates, March 1997.

"Final Close Out Report," USEPA Region IV, 1997.

"Notice of Deletion," by USEPA Region IV, December 31, 1997, Published in the Federal Register, v. 62, no. 250, page 68216.

"Quarterly Monitoring and Maintenance Report First Quarter 1998," by NWI Land Management, (April 1998).

"Quarterly Monitoring and Maintenance Report Second Quarter 1998," by NWT Land Management, (August 1998).

"Quarterly Monitoring and Maintenance Report Third Quarter 1998," by NWI Land Management, (November 1998).

"Quarterly Monitoring and Maintenance Report First Quarter 1999," by NWI Land Management, (April 1999).

"Quarterly Monitoring and Maintenance Report Third Quarter 1999," by NWI Land Management, (November 1999).

"Quarterly Monitoring and Maintenance Report Fourth Quarter 1999," by NWI Land Management, (March 2000).

"1999 Annual Report Long-Term Monitoring and Maintenance Program," by NWI Land Management, (April 2000).

"Remedial Action Progress Reports," by Conestoga-Rovers & Associates, (February, March, April, May, 1997).

"Final Site Inspection Letter," by Conestoga-Rovers & Associates, 13 February 1997.

Appendix B — Site Maps
North Hollywood Dump Site

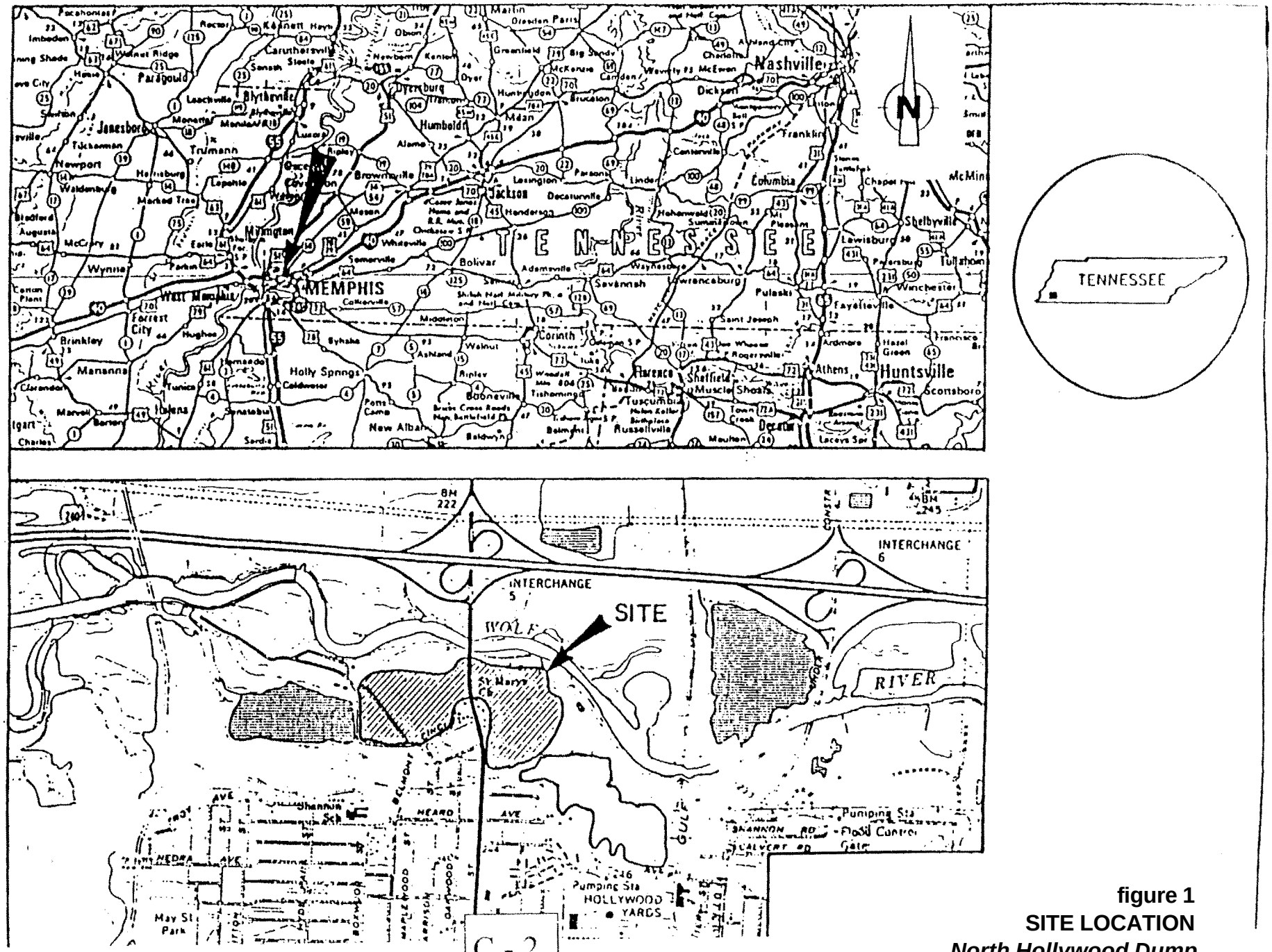


figure 1
SITE LOCATION
North Hollywood Dump

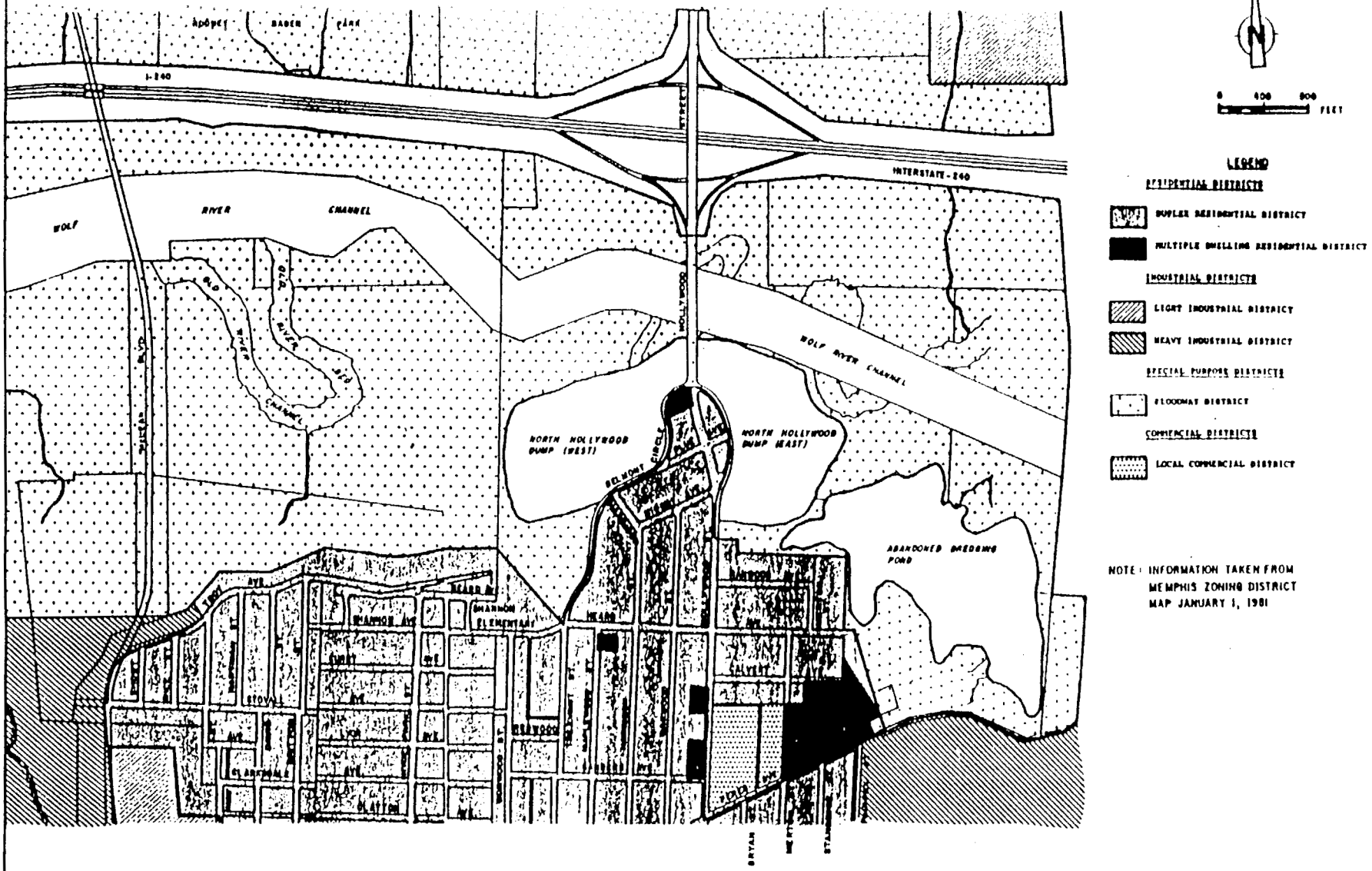


figure 2
LOCAL ZONING ADJACENT TO SITE
North Hollywood Dump

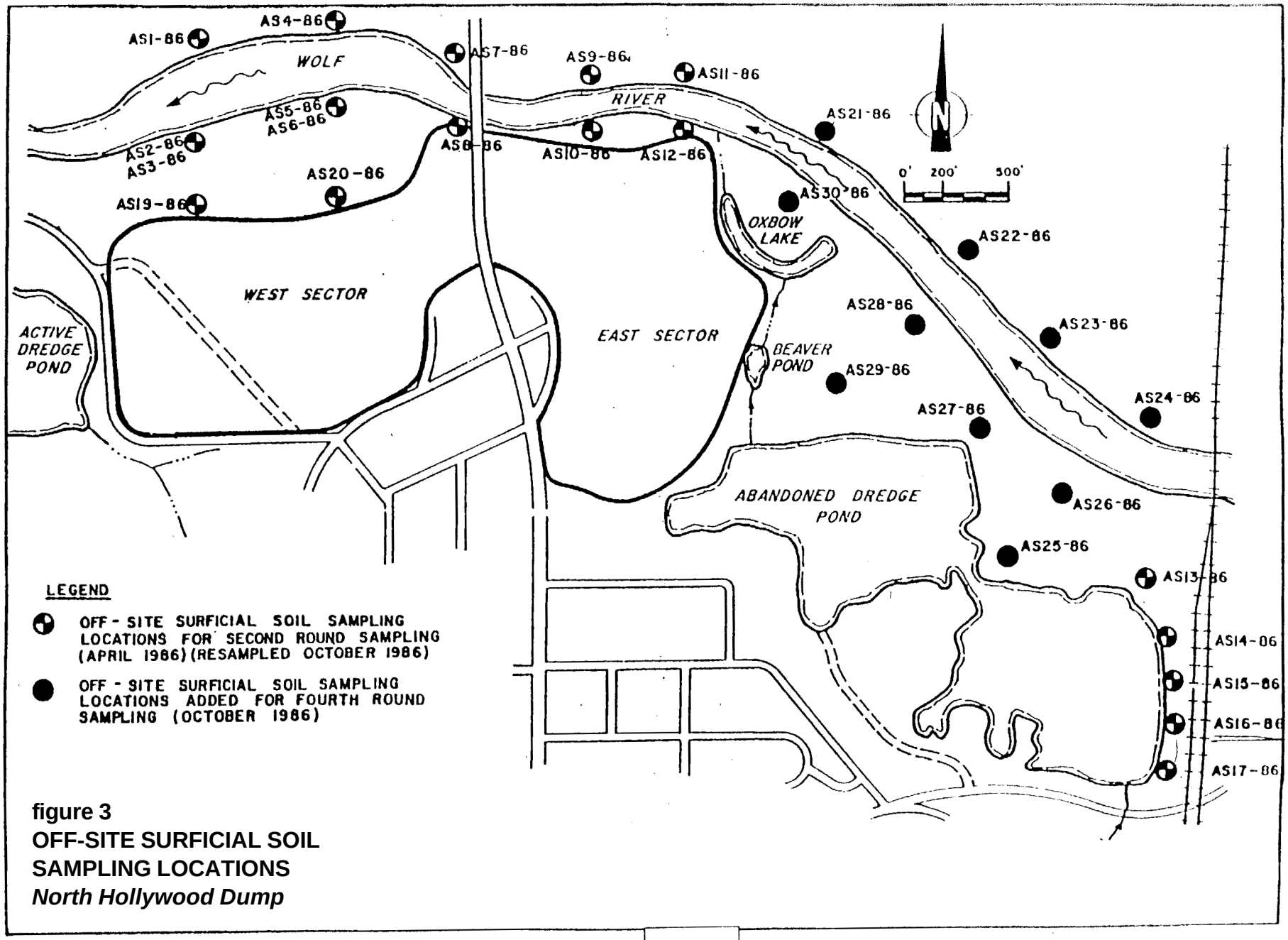


figure 3
OFF-SITE SURFICIAL SOIL SAMPLING LOCATIONS
North Hollywood Dump

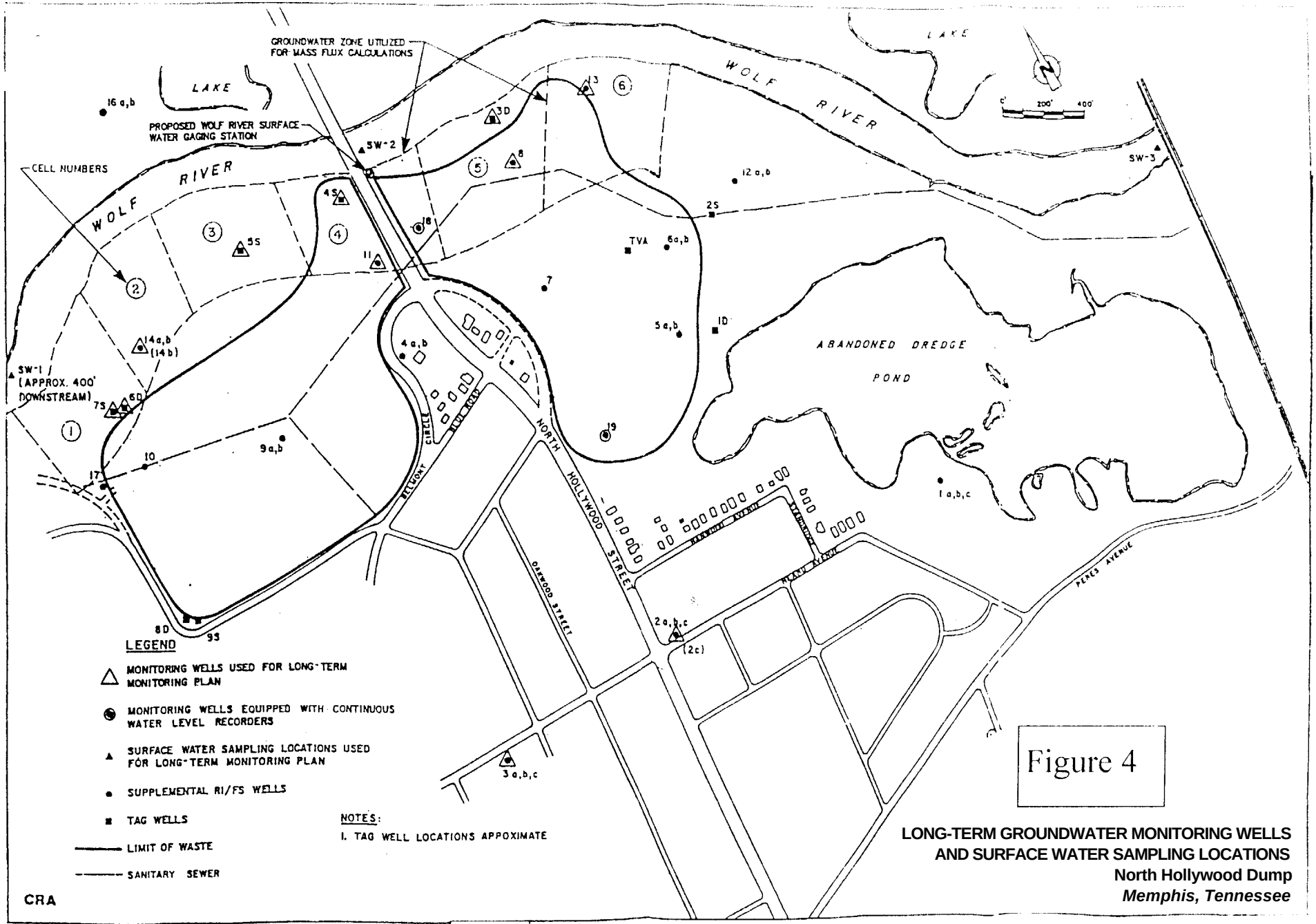


Figure 4

LONG-TERM GROUNDWATER MONITORING WELLS AND SURFACE WATER SAMPLING LOCATIONS
North Hollywood Dump
Memphis, Tennessee

3770 (10) APR 14/93 REV.0

Appendix C – Photographs of Site Inspection
North Hollywood Dump Site

1. General View Hollywood Street Bridge

2. View from East Sector under Hollywood Street Bridge

3. Scour under Hollywood Street Bridge

4. Scour under Hollywood Street Bridge

5. Drainage Pipe from Landfill at Hollywood Street Bridge along Wolf River

6. East Sector – Tractor Ruts in Landfill Cap

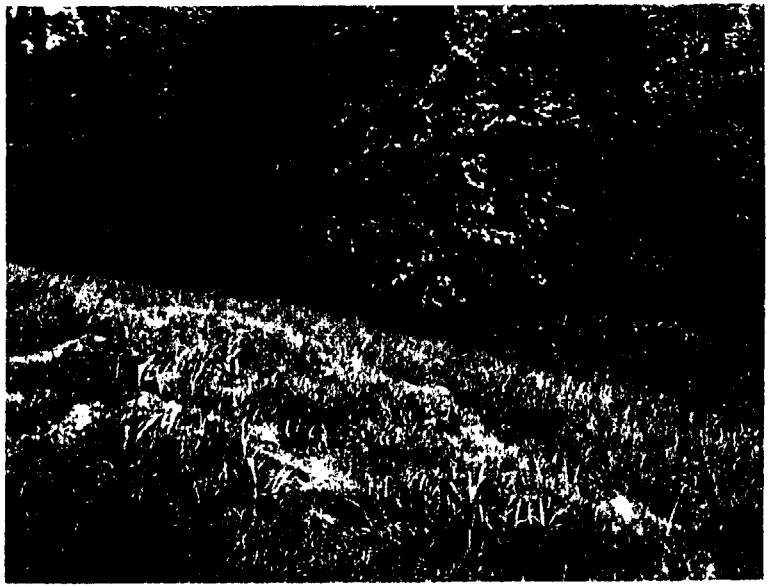
7. Abandoned Dredge Pond

8. Abandoned Dredge Pond – Fishing Boat

9. General View East Sector – Abandoned Dredge Pond in Background

10. General View East Sector – Abandoned Dredge Pond in Background

11. West Sector – Riprap Repair to Scour from Surface Water - Aggregate Plant in Background Adjacent to Site



12. East Sector – Landfill Slope with Wolf River in Background

13. General View - East Sector

14. General View - East Sector

15. General View - West Sector - Slope

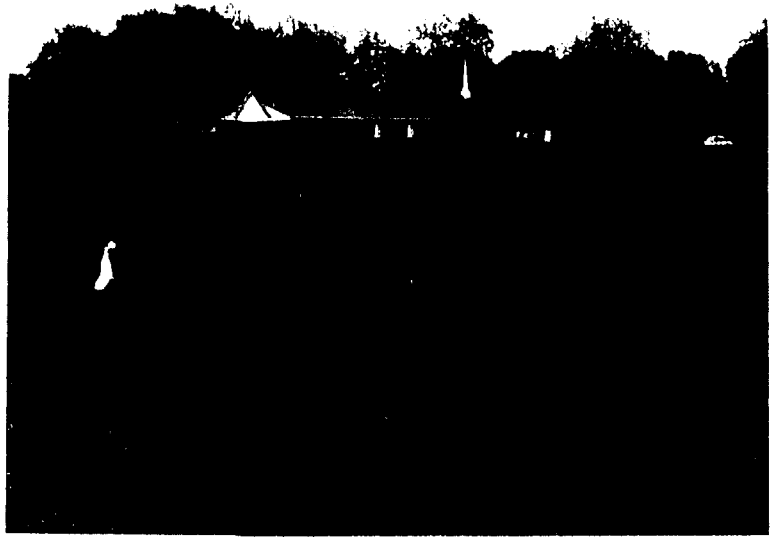
16. General View - West Sector with Aggregate Plant in Background

17. General View - West Sector

18. West Sector - Fill placed in Settlement Area to Restore Surface Drainage

19. East Sector - Fence with Church Adjacent to Site - Gravel Parking Area

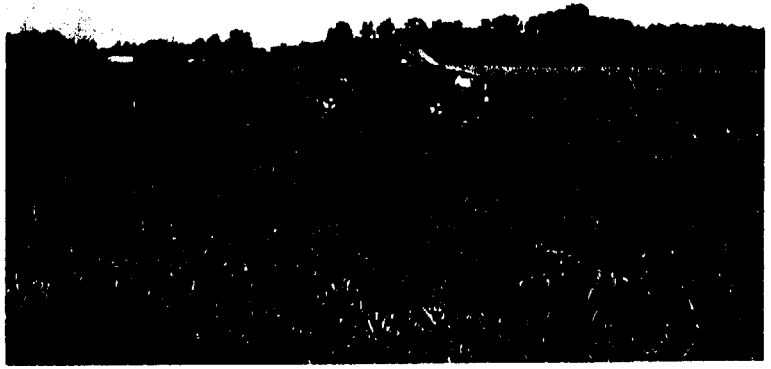
20. East Sector - Old Decontamination Site



21. USGS Satellite Well

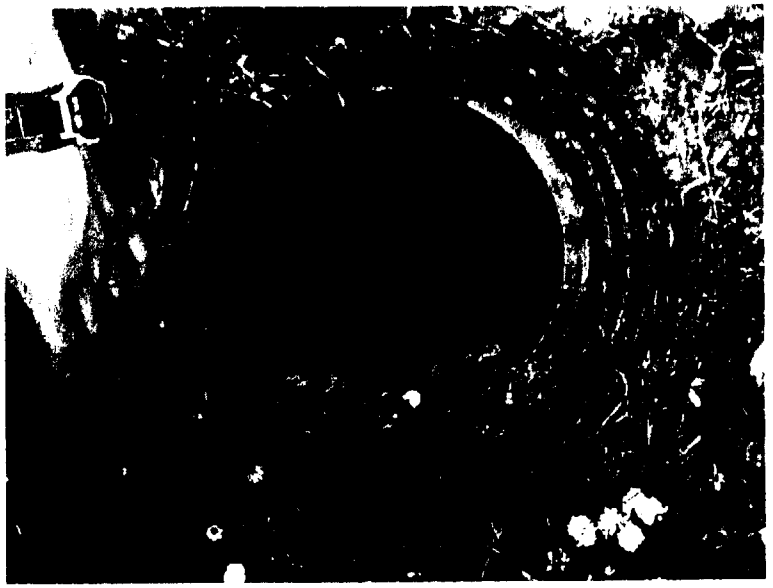
22. Typical Groundwater Monitoring Well used for Sampling. Note Water Tight Cap.

23. Groundwater Monitoring Well located between Landfill and Wolf River in the Floodplain – Properly Labeled



24. East Sector – Abandoned Groundwater Monitoring Wells

25. Upgradient Well off site in Adjacent Residential Area



26. Upgradient Well off site in Adjacent Residential Area

27. East Sector Along Fence on Hollywood Street - Surface Water Ponding

Appendix D – Letter Agreement Between USEPA And the Memphis Environmental Center North Hollywood Dump Site

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION V

345 COURTLAND STREET. N.E.
ATLANTA, GEORGIA 30365

APR 16 1993

Rec'd CRA
APR 21 1993

Mr. George Harvell
Manager, Environmental Services
Memphis Environmental Center, Inc.
2603 Corporate Avenue, Suite 100
Memphis, TN 38132

RE: North Hollywood RD Data Collection Report and Calculated Sediment Levels for the Impoundments

Dear Mr. Harvell:

The Environmental Protection Agency (EPA) has reviewed the draft January 20, 1993 Remedial Design (RD) Data Collection Report and the corresponding March 24, 1993 draft calculations of sediment background levels for the surface water impoundments.

As specified in the Record of Decision (ROD), EPA will establish acceptable sediment remediation goals for the impoundments based on calculations using fish and sediment samples taken in the RD and the fish tissue remediation goals. Based on the review of the data and different calculations, EPA agrees with Conestoga-Rovers' concern that since background pesticides levels in the area of the Site are higher than the some of the sediment actions levels calculated using a 10^{-6} carcinogenic risk for consuming the new fish after the impoundments are restocked, remediating the sediments to those levels will not be effective in the long-term. Although remediation to 10^{-6} sediment action levels map initially be accomplished, the sediments could be re-contaminated to the Site background levels by runoff and flooding. When possible, EPA remediates National Priorities List (NPL) Sites to a conservative 10^{-6} risk to maximize the protection of public health. However, due to Site background levels caused by other sources and their potential to contaminate the impoundments, EPA is establishing the sediment remediation goals using the higher of either the calculated 10^{-6} level or the calculated background level that EPA has approved. Using this criteria, the following are the North Hollywood Impoundment Sediment Remedial Action Goals for the four contaminants that were determined to require remediation by the RD Data Collection Report:

CONTAMINANT	REMEDIATION GOAL	SOURCE
Chlordane	1.66 mg/kg	Background
Chlordene	3.06 mg/kg	10^{-6} Risk
Endrin	0.20 mg/kg	Background
Heptachlor Epoxide	0.25 mg/kg	Background

These remediation levels are considered to be protective of both human health and the environment, and based on the fish/sediment calculations, are all within the acceptable 10^{-4} to 10^{-6} risk range for protection of human health. Based on the RD sampling, all sediment areas with detected pesticides above these levels must be covered per the requirements in the ROD. To assist final monitoring, the north Hollywood Dump Steering Committee can cover at their discretion any or all other areas of the impoundment sediments to substantiate that no small hot spots were missed.

After the fish in the impoundments have been removed and partially restocked to meet the 10^{-6} fish tissue goals for remediation, monitoring of the effectiveness of the impoundment remediation will be established based on a comparison of the pesticide levels in the fish in the Wolf River to those in the impoundments. Since fish from the river enter and leave the impoundments during flood conditions, and separation of the fish is impossible, comparison of the fish in the river to those in the impoundments will be the only effective way at present to determine that the impoundments are no longer increasing contamination in the fish. Since fish in the river will also be in the impoundments, fishing in the impoundments will have to be restricted as long as fishing in the river is prohibited.
A fish monitoring plan will be established along with the groundwater monitoring as part of the Operations and Maintenance plan.

Enclosed are EPA's specific comments on the report and the sediment background calculations. Please revise the report and calculations based on these comments. Include the background calculations as part of the report and send one draft redline copy to me for final review.

If you have any questions please contact me at (404) 347-7791.

Sincerely,

Felicia Barnett

Felicia Barnett
Remedial Project Manager
KY/TN Section, NSRB

Enclosure

cc: Floyd Heflin, TN
Kathy Urback, ORC
Elmer Akin, Risk
Lynn Wellman, ETAG
Kathy McClanahan, COE
Bruce Monteith, CRA